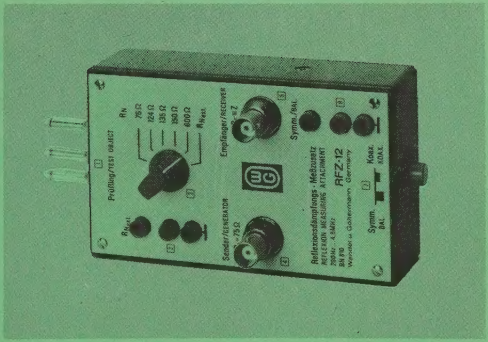
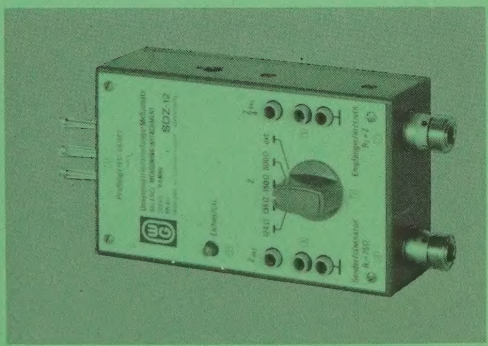
Description and Operating Manual





MP MASTER
MA29273

Return Loss Measuring Attachment RFZ-12
Signal Balance Ratio Measuring Attachment SDZ-12

BN 0810/00.82

RETURN LOSS MEASURING ATTACHMENT RFZ-12
SIGNAL BALANCE RATIO MEASURING ATTACHMENT SDZ-12

Frequency range 200 Hz to 4.5 MHz

Description and
Operating Manual BN 810/811, series A ...

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INTRODUCTION

Return Loss Measuring Attachment RFZ-12 and Signal Balance Ratio Measuring Attachment SDZ-12

In conjunction with the Level Measuring Setups PS-12/SPM-12, PS-6/SPM-6 and PS-60 (PSS-60)/SPM-60, the RFZ-12 may be used for simply and exactly measuring return loss at balanced and unbalanced test specimens operating up to a frequency of 4.5 MHz. Used with Level Measuring Setup PSM-8, to 2 MHz.

The Attachment SDZ-12 is suitable for measuring generator and receiver signal balance ratio in conformance with CCITT Recommendation O.121.

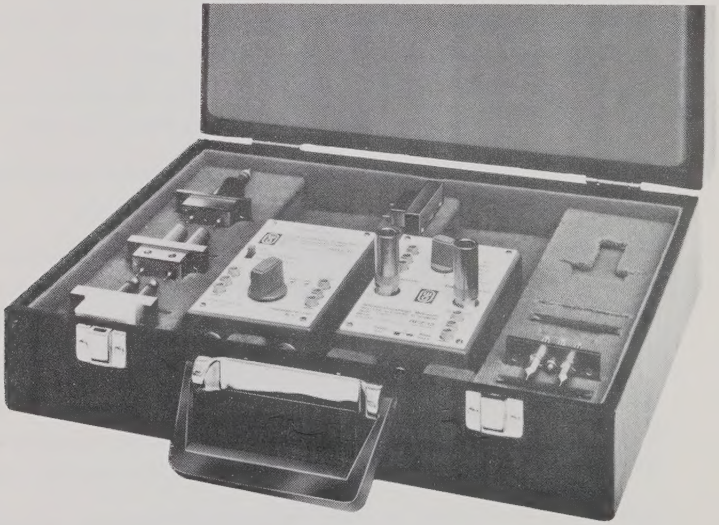
Measurements are made in range 200 Hz to 4.5 MHz (2 MHz) and may be either wideband or selective. When the Level Measuring Setup PSM-8 is used with Display Unit SG-2 or SG-3, especially easy and time-saving return loss measurements may be made by means of swept frequency operation.

The Measuring Attachments operate according to the method used with measuring bridges. For the usually used characteristic impedances, either a standard resistance (RFZ-12) or a termination resistance, where appropriate, are internally included.

By means of a rotary switch, the desired resistance can be selected, and with that a very simple manipulation is sufficient for concluding the measurement.
The Measuring Attachments additionally offer the possibility of connecting external standard or termination resistances, thus a universal application is provided.

The Measuring Attachments RFZ-12, BN 810 and SDZ-12, BN 811 can be delivered with connector adaptors fitted for various types of usually used connectors. And by means of simple screw and plug connections, the adaptors can be changed as needed.

For storing and transporting the Measuring Attachments RFZ-12 and SDZ-12 as well as including a complete set of adaptors, a carrying case is available if ordered.



Carrying and storage case for one each RFZ-12 and one each SDZ-12

1. TECHNICAL SPECIFICATIONS OF THE RETURN LOSS MEASURING ATTACHMENT RFZ-12

All essential characteristics of our instruments are, when not otherwise stated, given as guaranteed tolerance quantities and not as typical values. They are valid not only on delivery but also for the whole guarantee period.

The RFZ-12 is a Measuring Attachment used with Level Measuring Setups PSM-8, PS-12/SPM-12, PS-6/SPM-6 and PS-60 /PSS-60 /SPM-60 for measuring the return loss of balanced and unbalanded test specimens.

Unless otherwise stated the given error limits are valid under the rated operating conditions according to point 1.7. in conjunction with the quoted Measuring Setups.

1.1. Frequency range . . . . . 200 Hz to 4.5 MHz (with PSM-8 to 2 MHz)

1.2. Internal standard resistance

switchable to balanced . . . . . 124, 135, 150, 600 Ω
unbalanced . . . . . 75, 124, 135, 150, 600 Ω

External standard resistance . . . . . connectable to [2]

1.3. Bridge attenuation at r = 1

(Level Meter : high impedance, Generator : Z_{out} = 75 Ω)

for balanced test specimen . . . . . 40 dB
for unbalanced test specimen . . . . . 46 dB

1.4. Calibration [1]

(Switch [3] in position CAL, corresponds to r = 1)

Send frequency for calibration . . . . . 10 kHz

1.5. Error limits of measured return loss coefficient r

after calibration at f = 10 kHz

1.5.1. Balanced test specimen

for Z_o = 600 Ω	from 200 Hz to 620 kHz	± 0.003 ± 0.1 r
for Z_o = 135 Ω, 150 Ω	from 200 Hz to 620 kHz	± 0.001 ± 0.1 r
	from 200 Hz to 2 MHz	± 0.003 ± 0.1 r
for Z_o = 124 Ω	from 200 Hz to 620 kHz	±0.001 ± 0.1 r
	from 200 Hz to 2 MHz	±0.003 ± 0.1 r
	from 200 Hz to 4.5 MHz. . . .	±0.006 ± 0.2 r

1) With Attachments from Series D, the calibration is replaced by adjustment of reference |r| = 1 at 10 kHz: Select required standard resistor R_N with switch [3] Open connection at [1] , test object. Indicated receiver level corresponds to return loss |r| = 1.

1.5.2. Unbalanced test specimen

for Z_o = 600 Ω	from 200 Hz to 620 kHz	± 0.003 ± 0.15 r
for Z_o = 124, 135, 150 Ω	from 200 Hz to 620 kHz	± 0.001 ± 0.1 r
	from 200 Hz to 2 MHz	± 0.002 ± 0.1 r
	from 200 Hz to 4.5 MHz and r ≦ 0.1	± 0.003 ± 0.2 r
for Z_o = 75 Ω	from 200 Hz to 620 kHz	± 0.001 ± 0.1 r
	from 200 Hz to 2 MHz	± 0.002 ± 0.1 r
	from 200 Hz to 4.5 MHz. . . .	± 0.003 ± 0.1 r

1.6. Connections

1.6.1. Connector [1] for test specimen (see 1.9. for adaptor)

switchable at switch [7]

for balanced or unbalanced test specimens

Level at balanced test specimen at r = 1 . . . . . 40 dB below send level
Level at unbalanced test specimen at r = 1 . . . . 46 dB below send level

1.6.2. Connector [4] for level generator . . . . Universal connector Versacon Ⓡ 9

Input impedance, coaxial . . . . . 75 Ω
Max. permissible level . . . . . +10 dB

1.6.3. Connector [6] for level meter

With balanced test specimen . . . . . 3pole CF connector

The applied level meter is to be operated in balanced/high impedance mode.

1.6.4. Connector [5] for level meter

With unbalanced test specimen . . . . . Universal connector Versacon Ⓡ 9

The applied level meter is to be operated in unbalanced/high impedance mode.

1.6.5. Connector [2] for external standard resistance . . . . . 3pole CF connector

1.7. Rated operating conditions

1.7.1. Frequency range with:

CF connector, CF connector (Hasler), 379 A WE (USA) and
Universal connector Versacon Ⓡ 9; Z_o = 124 Ω . . . . 200 Hz to 4.5 MHz (with PSM-8 to 2 MHz)

PJ 1 (USA) . . . . . Z_o = 135 Ω . . . . 200 Hz to 300kHz
310 WE (USA) . . . . . Z_o = 600 Ω . . . . 200 Hz to 60 kHz

1.7.2. Standard resistance, internal Z_o values . . . . 75, 124, 135, 150, 600 Ω

1.7.3. Connecting the RFZ-12 to the Measuring Setup

Output impedance of generator . . . . . 75 Ω
Input impedance of level meter . . . . . high impedance
Maximum cable capacity to level meter . . . . . 30 pF

1.7.4. Ambient temperature . . . . . - 10 °C to + 55 °C

1.8. General specifications

Ambient temperature for storage and transport . . . . - 40 °C to + 70 °C
Dimensions in mm (w x h x d) without plug. . . . . 75 x 56 x 133
Weight . . . . . approx. 430 g

1.9. Ordering Information

Return Loss Measuring Attachment RFZ-12. . . . . BN 810/01.00

Equipped with CF adaptor BN 810/00.01 for connecting test specimen to plug [1] (belongs in standard package)

Additionally available adaptors (at extra cost)

with CF plug (Hasler) . . . . . BN 810/00.02
with 379 A WE (USA) Z_o = 124 Ω . . . . . BN 810/00.03
with PJ 1 (USA) Z_o = 135 Ω . . . . . BN 810/00.04
with 310 WE (USA) Z_o = 600 Ω . . . . . BN 810/00.05
with Versacon (R) 9 . . . . . BN 810/00.06

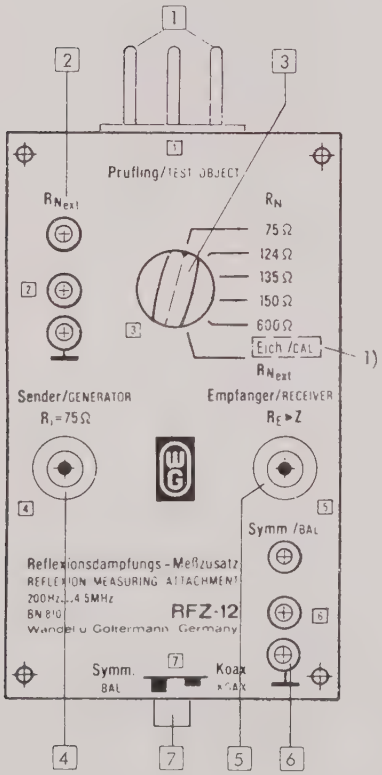
When the Versacon (R) 9 is used, the following connectors (M) may be selected according to choice:

1.6/10, Lemo, 2.5/6, 1.6/5.6, 339 GPO, 358 A

Please request chosen connector at the time order is placed.

Optional accessories (at extra cost)
Carrying case for one each RFZ-12 and one each SDZ-12 and a set of adaptors . . . . . BN 026/8

Subject to change without notice



1 3pole CF plug St 101; connection for test specimen

2 3pole CF connector Bu 102; connection for external standard resistance

3 Selector switch S 102; internal standard resistances, or CALIBRATE, or $R_{N_{external}}$

4 Universal connector Bu 101; connection for generator with Z_{out} = 75 Ω

5 Universal connector Bu 103; connection for level meter with $Z_{in} \gg Z_o$

6 3pole CF connector Bu 104; for balanced measurements (connecting to the level meter)

7 Switch, balanced/coaxial

Fig.2-1 RFZ-12 Front view

1) Marking "Eich/Cal" omitted with Attachments from Series D

2. OPERATION

2.1. Connecting to the Return Loss Measuring Attachment RFZ-12

The measuring configuration should be setup as either (balanced test specimen) of Fig. 2-2 or (unbalanced test specimen) of Fig. 2-3.

When measuring at the upper frequency limit of the RFZ-12, it should be observed that the Level Meter cable capacitance does not exceed 30 pF because this could cause an additional error introduced by variation with frequency. With the measuring setups as given, the cable lengths may be about 30 cm.

Various adaptors matching normal commercial connectors are available for connecting the test specimen to plug [1].

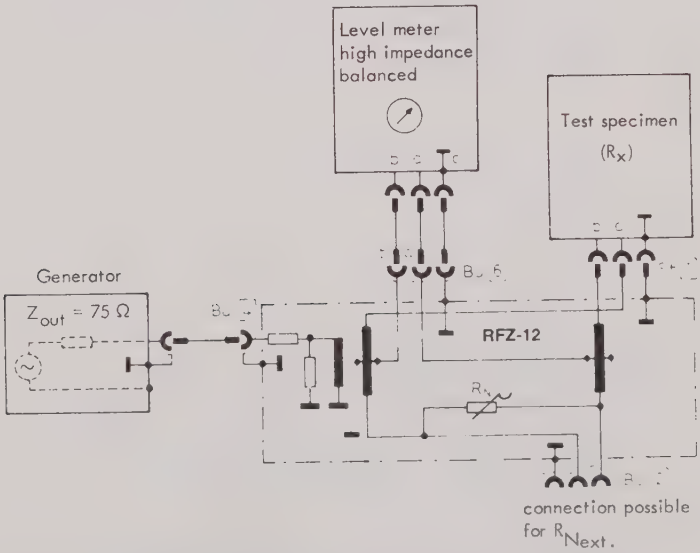


Fig. 2-2 Balanced Operating Mode

2.2. Measuring the return loss of a balanced test specimen

- Connect test specimen to [1]
- Actuate push button [7] (BAL position)
- Connect level meter to Bu [6], high impedance input
- Connect level generator to Bu [4], $Z_{out} = 75\ \Omega$

2.2.1. Calibration

Before measurements are made, the bridge should be calibrated at f = 10 kHz 1)

- Switch [3] set at CAL (corresponds to return loss coefficient, r = 1)
- No external resistance is permitted at Bu [2]

With a 0 dB send level, the level meter now shows approx. - 40 dB deflection. By means of changing the send level, the meter reading on the level meter can be brought to exactly 0 dB. This value corresponds to a return loss ratio of 0 dB or a return loss coefficient of r = 1, and at the same time it is the reference level for the return loss ratio.

2.2.2. Measurements

The following measurements are referred to the reference level established in 2.2.1.

- Switch [3] switched to the desired internal Z_o value or else an external standard resistor, R_N, can be plugged into connector [2]
  (if an external Z_o value is used, then the bridge must first be balanced according to 2.4.)
- Raise the sensitivity of the level meter
- Read level meter deflection and subtract it from reference level.

Example:

Measurement mode, balanced with internal R_N

Send level = - 10 dB

Indicated level at level meter (Bu [6]) in position CAL at f = 10 kHz: - 50 dB

Switch to Z_o value and read level meter, e.g. - 82 dB

a_R = - 50 dB - (- 82) dB = 32 dB

1) With Attachments from Series D, the calibration is omitted: Instead, switch [3] is used for selecting the desired standard resistor, R_N. There cannot be a test object connected to [1] (corresponds to return loss coefficient $|r| = 1$).

2.3. Measuring the return loss of an unbalanced test specimen

The coaxial plug version BN 810/00.06 should be used with the adapter Versacon ® 9

- Connect test specimen to plug [1]
- Actuate push button [7] (KOAX position)
- Connect level meter to connector [5], high impedance input
- Connect level generator to connector [4], Z_{out} = 75 Ω

2.3.1. Calibration

Before the measurement, the bridge should be calibrated at f = 10 kHz

- Switch [3] at CAL (corresponds to return loss coefficient r = 1)
- No external resistance is permitted at connector [2]

see footnote 1) on page 6

With - 4 dB send level, the level meter indicates a level of approx. - 50 dB. Through changing the send level, the meter reading can be brought to exactly 0 dB on the level meter. This value corresponds to 0 dB return loss ratio or a return loss coefficient of r = 1 and is, at the same time, the reference level for the return loss ratio.

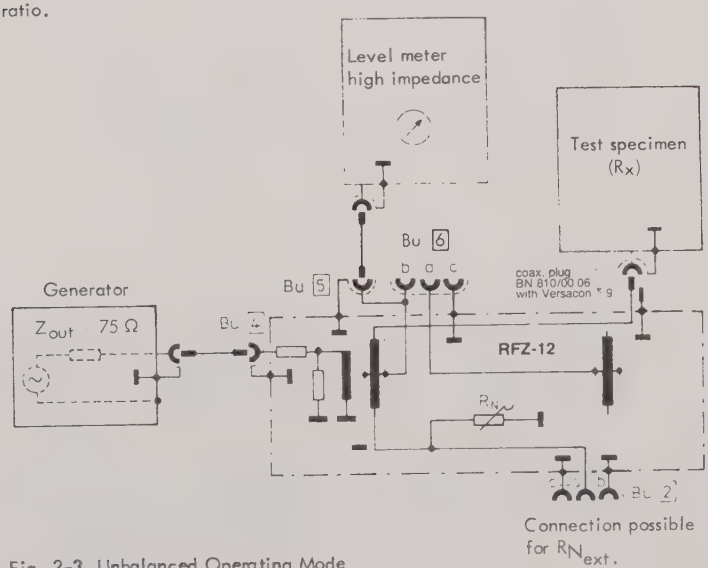


Fig. 2-3 Unbalanced Operating Mode

2.3.2. Measurement

The following measurement is referred to the reference level according to 2.3.1.

- Switch [3] set at definite internal Z value, or external standard resistor plugged into Bu [2] (when an external Z value is used, first the bridge must be balanced according to section 2.4.)
- Raise sensitivity of level meter
- Read value on level meter and subtract from reference level

Example:

Measurement mode, KOAX with $R_{N\,INT}$

Send level, - 4 dB

Indicated level on level meter (Bu [5]) in position CAL at f = 10 kHz: - 50 dB

Switch to Z value and read level at level meter, it reads - 88 dB

$$a_R = -50\ dB - (-88)\ dB = 38\ dB$$

2.4. Measuring the return loss when using an external standard resistance

- Standard resistance connected to Bu [2] has same value as Z_o at plug [1]
- Switch [3] at $R_{N\,ext}$
- Push button [7] in desired position (balanced or unbalanced)
- Level meter connected to Bu [6] (balanced) or Bu [5] (unbalanced), high impedance input
- Level generator connected to Bu [4], $Z_{out} = 75\ \Omega$

2.4.1. Bridge balancing

The bridge is first balanced for maximum return loss with C 109 in the unbalanced operating mode, then in balanced operating mode with C 108 (see Fig. 2-4). The trimmers (see Fig. 2-5) are accessible at the bottom cover, without opening the instrument.

These designations are valid for Series A and B Attachments. With Series C the trimmers are: C 114 for unbalanced and C 109 for balanced measurement mode.

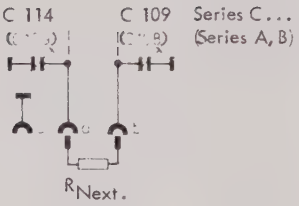


Fig. 2-4

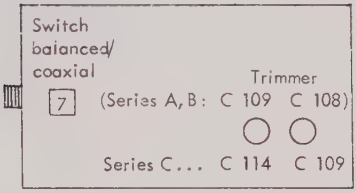


Fig. 2-5

2.4.2. Calibration [1]

- Remove standard resistance from plug [1]
- Set send level ≦ + 10 dB (f = 10 kHz)
- Read level at level meter and note value (= reference value)

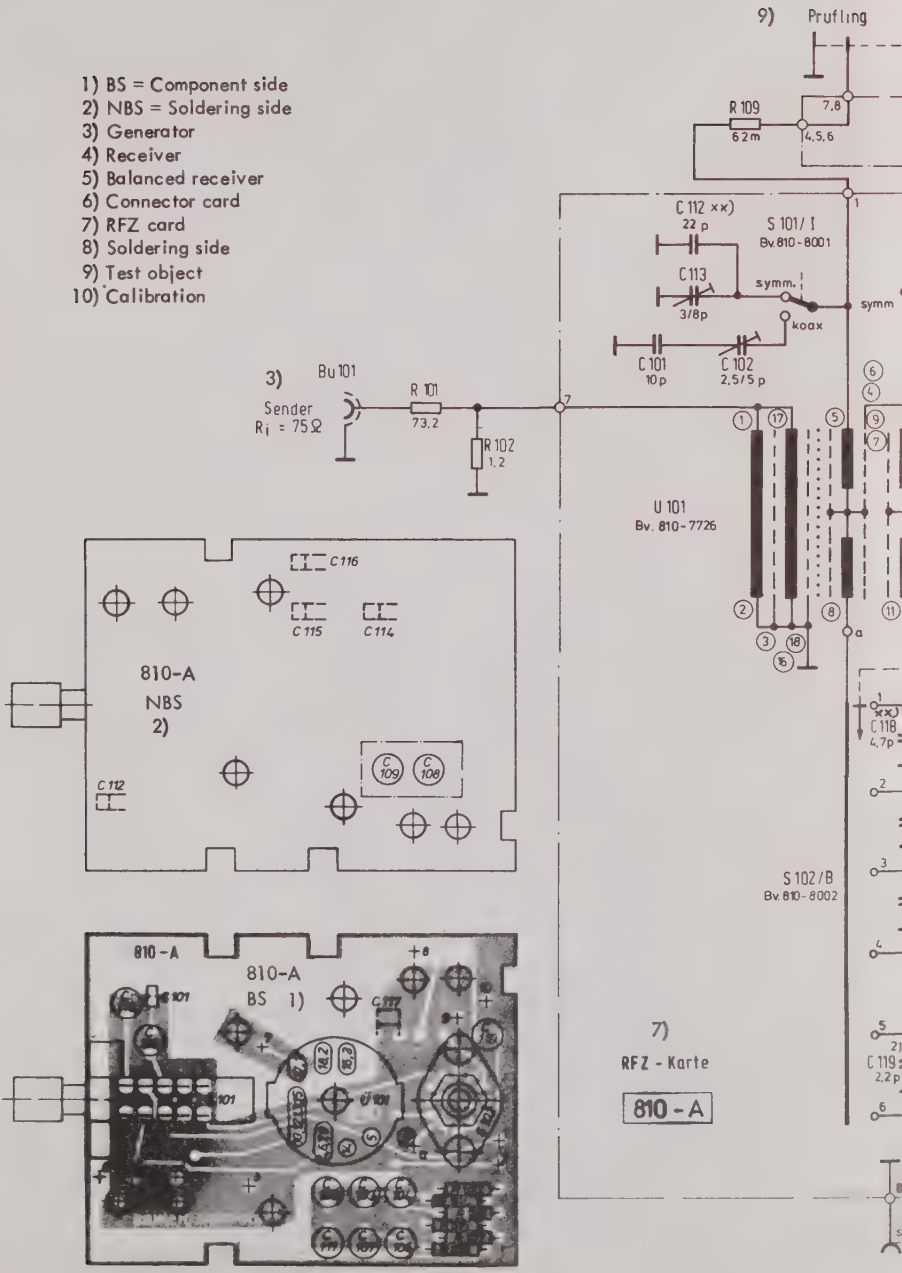
2.4.3. Measurement

The following measurement is referred to the reference level according to 2.4.2.

- Connect test specimen to plug [1]
- Raise sensitivity at level meter
- Read level meter and subtract reading from reference level

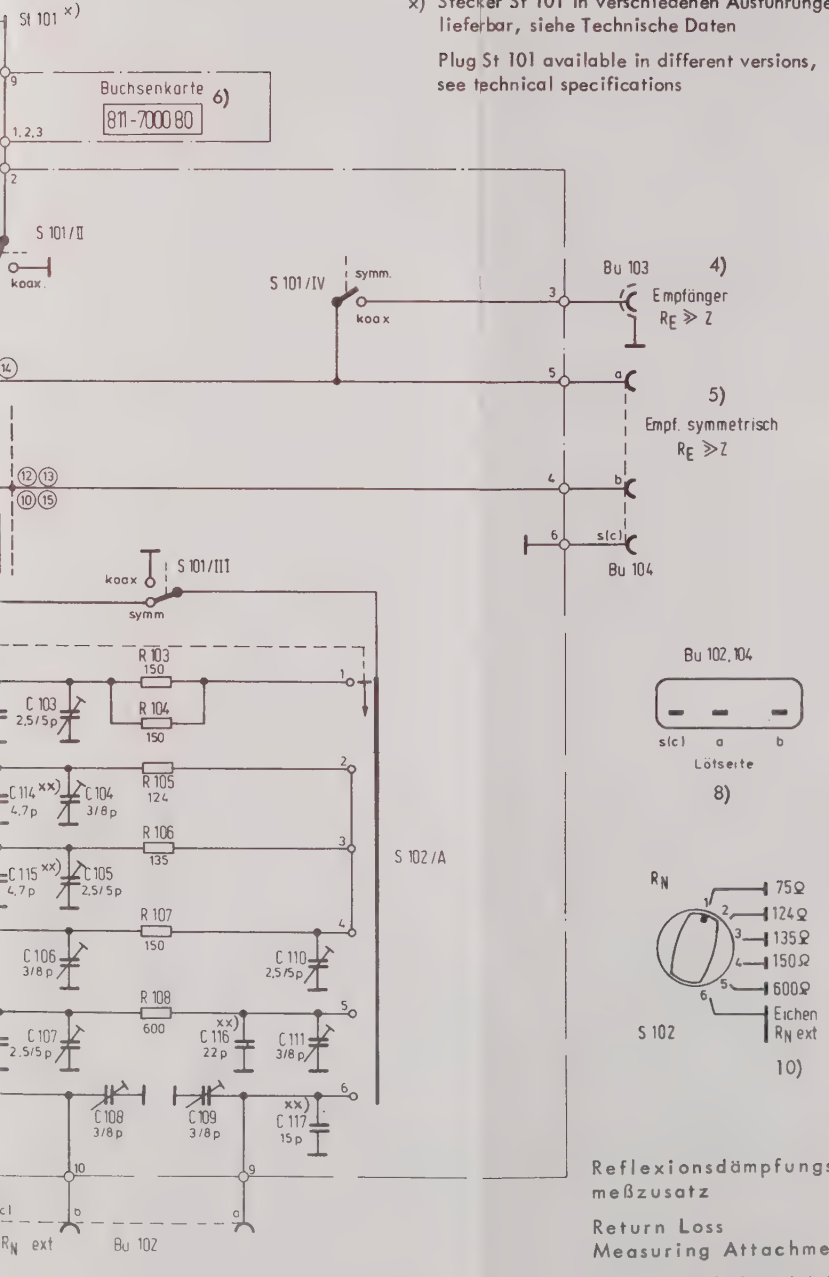
1) With Attachments from Series D, adjustment of reference: test object removed from connector [1]

1) BS = Component side
2) NBS = Soldering side
3) Generator
4) Receiver
5) Balanced receiver
6) Connector card
7) RFZ card
8) Soldering side
9) Test object
10) Calibration



x) Stecker St 101 in verschiedenen Ausführungen lieferbar, siehe Technische Daten

Plug St 101 available in different versions, see technical specifications

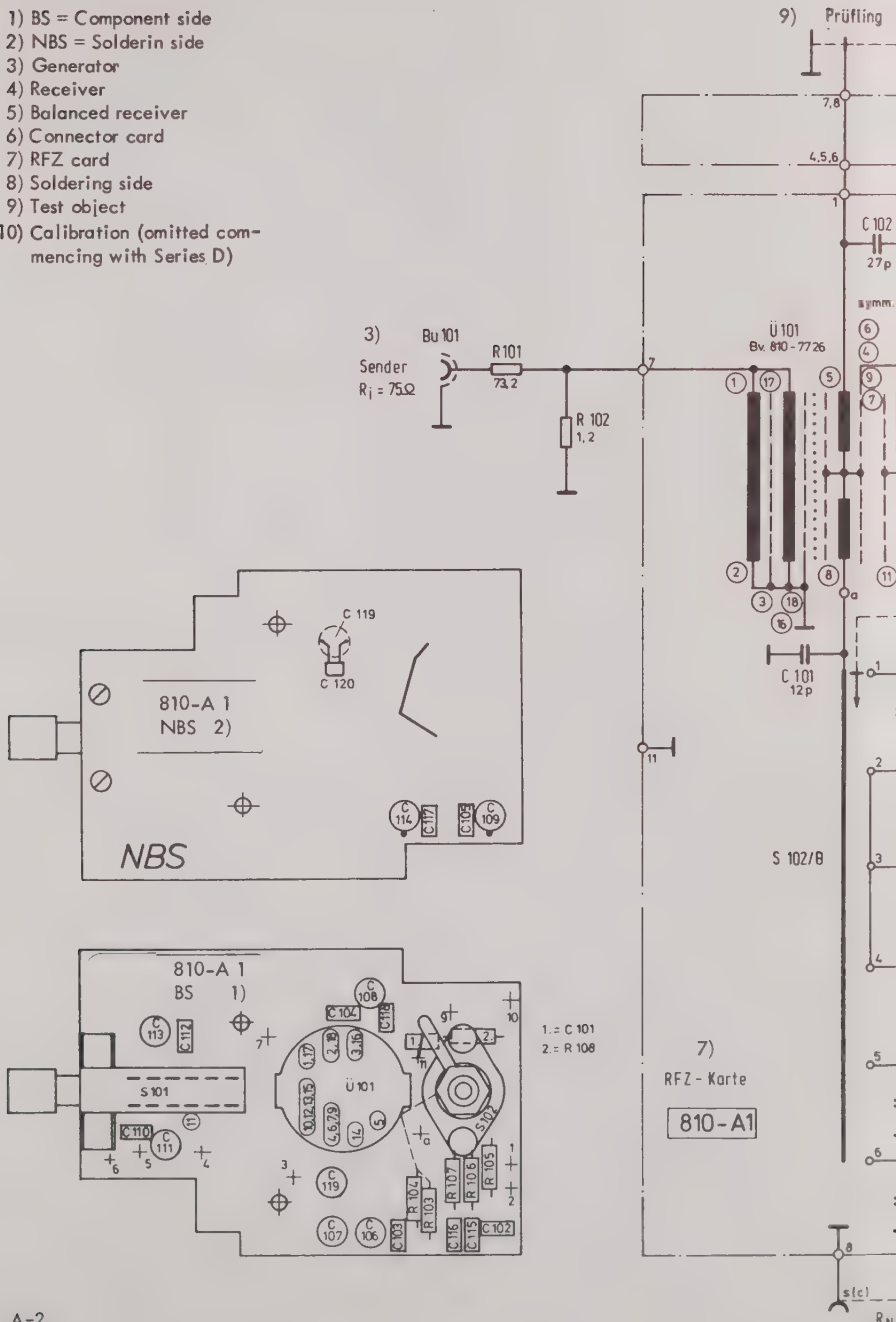


Reflexionsdämpfungs-meßzusatz RFZ-12

Return Loss Measuring Attachment BN 810

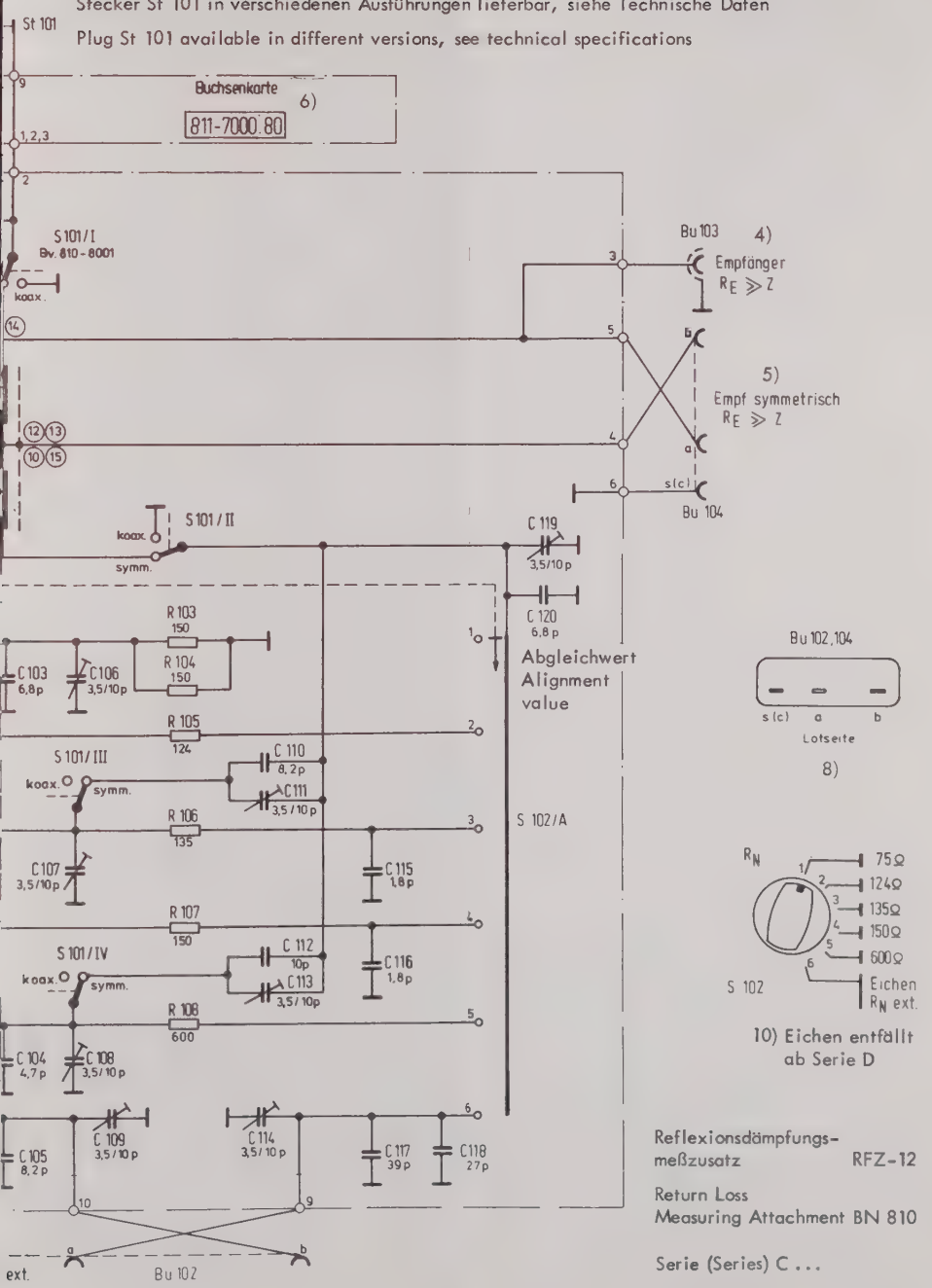
Nur Serie (only Series) A, B

1) BS = Component side
2) NBS = Solderin side
3) Generator
4) Receiver
5) Balanced receiver
6) Connector card
7) RFZ card
8) Soldering side
9) Test object
10) Calibration (omitted commencing with Series D)



Stecker St 101 in verschiedenen Ausführungen lieferbar, siehe Technische Daten

Plug St 101 available in different versions, see technical specifications



Reflexionsdämpfungs-
meßzusatz RFZ-12

Return Loss
Measuring Attachment BN 810

Serie (Series) C ...

Teil	Stck	Bezeichnung	Elektrische Werte	Bestellangaben Benennung ·	Hersteller, Anmerkgn
R 101	1	Schichtwid.	73,2 Ω / 1 % / TK 50 / 0207		WN 18 / 4 / 1
R 102	1	Schichtwid.	1,2 Ω / 5 % / K1 2 / 0309		
R 103	1	Schichtwid.	150 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
R 104	1	Schichtwid.	150 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
R 105	1	Schichtwid.	124 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
R 106	1	Schichtwid.	135 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
R 107	1	Schichtwid.	150 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
R 108	1	Schichtwid.	600 Ω /0,1 % / TK 50 / 0207		WN 18 / 4 / 1
				Glossary German-English	
				Abgleichwert = Alignment value	
				Buchse = Connector	
				Ker.-Kond. = Ceramic capacitor	
C 101	1	Ker.-Kond.	12 pF / 2 % / NPO	Schalter = Switch	
C 102	1	Ker.-Kond.	27 pF / 2 % / NPO	Scheibentrimmer = Disc trimmer	
C 103	1	Ker.-Kond.	6,8 pF ± 0,25 pF / NPO	Schichtwid. = Film resistor	
C 104	1	Ker.-Kond.	4,7 pF ± 0,25 pF / NPO	Stecker = Plug	WN 110 / 2 / 9
C 105	1	Ker.-Kond.	8,2 pF ± 0,25 pF / NPO	Übertrager = Transformer	WN 110 / 2 / 9
C 106	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 107	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 108	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 109	1	Trimmer	3,5 /10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 110	1	Ker.-Kond.	8,2 pF / ± 0,25 pF / NPO		WN 110 / 2 / 9
C 111	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 112	1	Ker.-Kond.	10 pF / 2 % / NPO		WN 110 / 2 / 9
C 113	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 114	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner

Reflexionsdämpfungsmeßzusatz RFZ-12
Return Loss Measuring Attachment BN 810

Ter.	Stck.	Bezeichnung	Elektrische Werte	Bestellangaben Benennung	Hersteller Anmerkgn.
C 115	1	Ker.-Kond.	1,8 pF / ± 0,25 pF / NPO		WN 110 / 2 / 9
C 116	1	Ker.-Kond.	1,8 pF / ± 0,25 pF / NPO		WN 110 / 2 / 9
C 117	1	Ker.-Kond.	39 pF / 2 % / NPO		WN 110 / 2 / 9
C 118	1	Ker.-Kond.	27 pF / 2 % / NPO		WN 110 / 2 / 9
C 119	1	Trimmer	3,5 / 10 pF / NPO	5 S - Triko Nr. 302504 104	Stettner
C 120	1	Ker.-Kond.	6,8 pF / ± 0,25 pF / NPO		WN 110 / 2 / 9
S 101	1	Schalter		Bv. 810 - 8001	
S 102	1	Schalter	SB 16 m. Lötstiften, 2- polig Anschlag : Raststellg. 6	Achslänge : 1 = 20 mm	WN 13 / 3 / 5
			SB 16 avec cosses à souder 2 contacts Butée en position 6		
Ü 101	1	Übertrager		Bv. 810 - 7726	
Bu 101	1	Buchse	Uni 9 B	810 - 0010.00 / 5 m. St.	
Bu 102	1	Buchse			WN 119 / 1 / 5
Bu 103	1	Buchse	Uni 9 D 1		WN 110 / 9 / 4
Bu 104	1	Buchse			WN 119 / 1 / 5
St 101	1	Stecker		Bv. 810 - 8401	

Reflexionsdämpfungsmeßzusatz RFZ-12
Return Loss Measuring Attachment BN 810

1. TECHNICAL SPECIFICATIONS OF THE SIGNAL BALANCE RATIO MEASURING ATTACHMENT SDZ-12

All essential characteristics of our instruments are, when not otherwise stated, given as guaranteed tolerance quantities and not as typical values. They are valid not only on delivery but also for the whole guarantee period.

The SDZ-12 is a Measuring Attachment used with Level Measuring Setups PSM-8, PS-12/SPM-12, PS-6/SPM-6 and PS-60 (PSS-60)/SPM-60 for measuring the signal balance ratio of generators and receivers according to CCITT Recommendation O.121.

Unless otherwise stated, the given specifications are valid under the rated operating conditions according to point 1.5.

1.1. Frequency range . . . . . 200 Hz to 4.5 MHz (with PSM-8 to 2 MHz)

1.2. Termination and Z/4 resistances:

internal, switchable to . . . . . Z = 124, 135, 150, 600 Ω

External termination and Z/4 resistances can be connected to [3] and [5]

1.3. Intrinsic signal balance ratio

for Z = 600 Ω	from 200 Hz to 120 kHz	≧ 60 dB
for Z = 124 Ω to 150 Ω	from 200 Hz to 620 kHz	≧ 60 dB
	from 200 Hz to 2 MHz	≧ 54 dB
	from 200 Hz to 4.5 MHz	≧ 50 dB
	from 200 Hz to 10 MHz	approx. 36 dB

1.4. Connections

1.4.1. Connector [1] for test specimen (see 1.7. for adaptors)

Input impedance, balanced . . . . . Z ‖ 250 mH ‖ 50 pF

Conductor a or b to chassis-ground . . . . . 100 pF

1.4.2. Connector [6] for level generator . . . Universal connector Versacon ® 9

The level generator applied is to be operated with Z_{out} = 0
Max. permissible level . . . . . +10 dB
When the signal balance ratio is measured at level meters, this connector is in parallel with [7]

1.4.3. Connector [7] for level meter . . . . Universal connector Versacon ® 9

The level meter applied is to be operated with high impedance input

1.4.4. Connectors [3] and [5]

for external termination and Z/4 resistances . . . . . 3pole CF connector

1.5. Rated operating conditions

1.5.1. Frequency range with CF plug, CF plug (Hasler), 379 A WE (USA) and Universal connector Versacon (R) 9, $Z_o = 124\ \Omega$ . . . . 200 Hz to 4.5 MHz (with PSM-8 to 2 MHz)

PJ 1 (USA) $Z_o = 135\ \Omega$ . . . . 200 Hz to 300 kHz

310 WE (USA) $Z_o = 600\ \Omega$ . . . . 200 Hz to 120 kHz

1.5.2. Termination resistances internally switchable to . . $Z_o = 124, 135, 150, 600\ \Omega$

1.5.3. Connecting the SDZ-12 to the Measuring Setup

Output impedance of Generator. . . . . $\approx 0\ \Omega$

Input impedance of level meter . . . . . high impedance

Maximum cable capacity for level meter . . . . . 30 pF

1.5.4. Ambient Temperature. . . . . - 10 °C to + 55 °C

1.6. General Specifications

Ambient temperature for storage and transport. . . . . - 40 °C to + 70 °C

Dimensions in mm (w x h x d) without plugs and connectors 75 x 62 x 125

Weight . . . . . 650 g

1.7. Ordering Information

Signal Balance Ratio Measuring Attachment SDZ-12 . . . . BN 811/01.00
equipped with CF adaptor BN 810/00.01 for connecting test specimen to plug 1 (belongs in standard package)

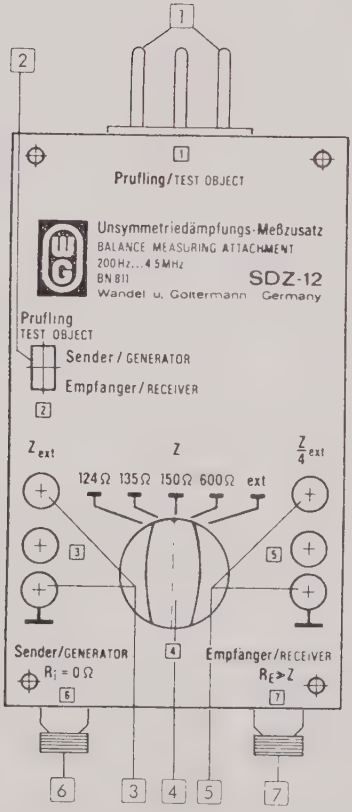
Additionally available adaptors (extra charge):

with CF plug (Hasler)		BN 810/00.02
with 379 A WE (USA)	$Z_o = 124\ \Omega$	BN 810/00.03
with PJ 1 (USA)	$Z_o = 135\ \Omega$	BN 810/00.04
with 310 WE (USA)	$Z_o = 600\ \Omega$	BN 810/00.05

Optional accessories (at extra cost)

Carrying case for one each RFZ-12 and one each SDZ-12 and a set of adaptors . . . . . BN 626/8

Subject to change without notice



1 3pole CF plug St 101, connector for test specimen (generator or receiver)

2 Selector switch S 102, generator or receiver as test specimen

3 3pole CF connector Bu 104, connection for an external termination resistance

4 Selector switch S 101, internal or external termination resistance

5 3pole CF connector Bu 103, connector for Z/4 resistances

6 Universal connector Bu 101, connector for test generator with $Z_{out} \approx 0\,\Omega$

7 Universal connector Bu 102, connector for test receiver with $Z_{in} \gg Z_o$

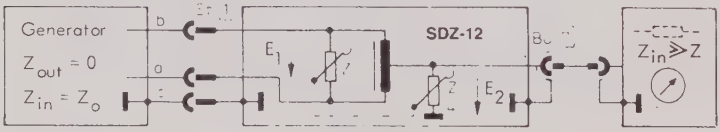
Fig.2-6 SDZ-12 Front view

Definition of the generator signal balance ratio

according to CCITT Recommendation O. 121.

$$a_B = 20 \log_{10} \frac{E_1}{E_2} \text{ dB}$$ or a_B (in dB) = send level–receive level

With that E_1 is the voltage between connectors a and b of the generator; E_2 is the voltage at connector [7] to chassis-ground



Generator as test specimen

Level meter (high impedance) as test instrument

Fig. 2-7

2.1. Connecting the Signal Balance Ratio Measuring Attachment SDZ-12

The measuring configuration is to be setup according to Fig. 2-7 when a generator is the test specimen, and according to Fig. 2-8 when a level meter is the test specimen.

With measurements at the upper frequency limit of the SDZ-12, pains should be taken to avoid exceeding 30 pF capacitance in the connecting cable to the level meter because an additional error due to variation with frequency could then arise. The measuring setups as illustrated permit using a cable length of approx. 30 cm. For connecting the test specimen to plug [1], adaptors of various commercially used connector systems are available.

2.2. Measuring the signal balance ratio

of a generator or an amplifier output

2.2.1. Measuring with use of the internal termination Z_o and $Z/4$ resistances

- Switch [2] of SDZ-12 in position GENERATOR
- Switch [4] to chosen Z value (124 to 600 Ω)

- Select Z value to equal generator Z
- Switch level meter input to "high impedance"
- Set generator level ≦ +10 dB
- Read level at level meter and subtract from send level.

2.2.2. Measuring with use of external termination and Z/4 resistances

- Switch [2] of SDZ-12 in position GENERATOR
- Connect external Z resistance to connector [3]
- Connect external Z/4 resistance to connector [5]
- Switch level meter input to "high impedance"
- Read level at level meter and subtract from send level

Definition of receiver signal balance ratio

according to CCITT Recommendation O. 121.

$$a_B = 20 \log_{10} \frac{E_1}{E_2} \text{ dB} \quad \text{or} \quad a_B \text{ (in dB)} = \text{send level} - \text{receive level}$$

With that, E_1 is the voltage to chassis-ground at generator output, if generator $Z_{out} \approx 0$. E_2 is the voltage between connectors a and b at test specimen.

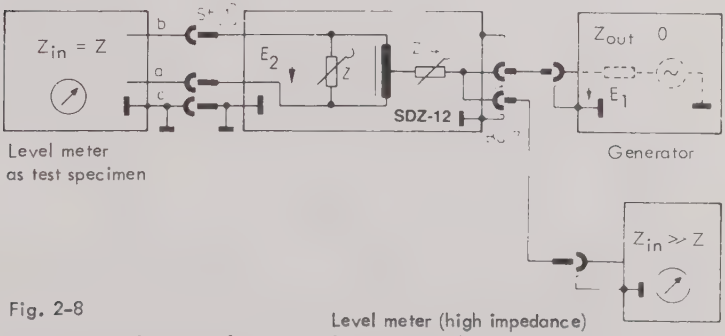


Fig. 2-8

Measuring configuration for level meter as test specimen

Level meter (high impedance) for measuring the reference level E_1 if generator's $Z_{out} > 0$

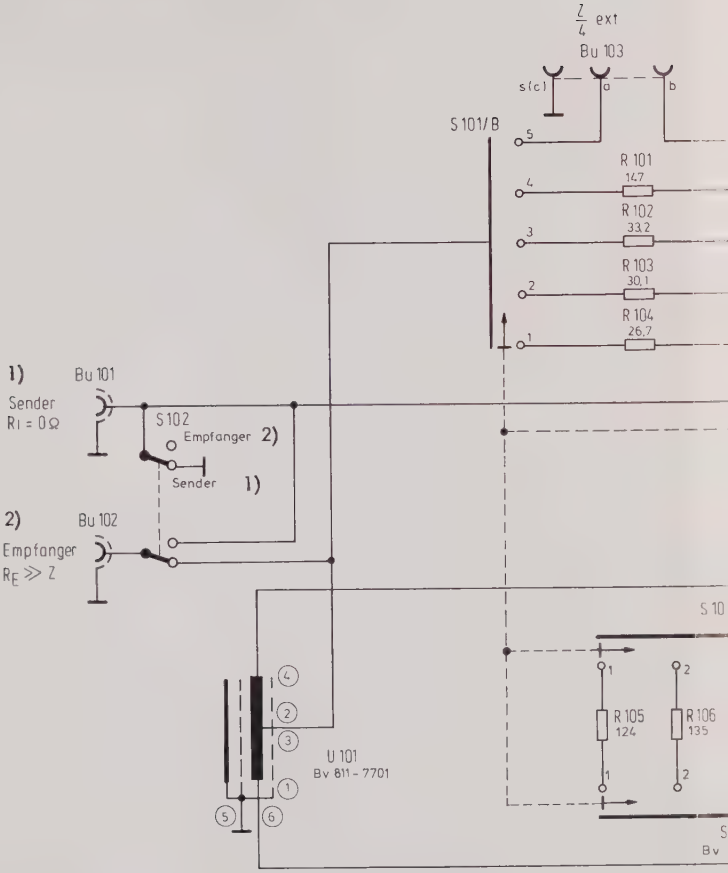
2.3. Measuring the signal balance ratio of a level meter or an amplifier input

2.3.1. Measuring with use of the internal termination Z_o and $Z/4$ resistances

- Measuring configuration set up according to Fig. 2-8 with generator at $Z_{out} \approx 0$, without a second level meter
- switch [2] of SDZ-12 in position RECEIVER
- switch [4] at same Z value as at test specimen
- adjust send level to definite value (max. + 10 dB)
- read level indication at test specimen and subtract from send level.

2.3.2. Measuring with use of external termination and $Z/4$ resistances

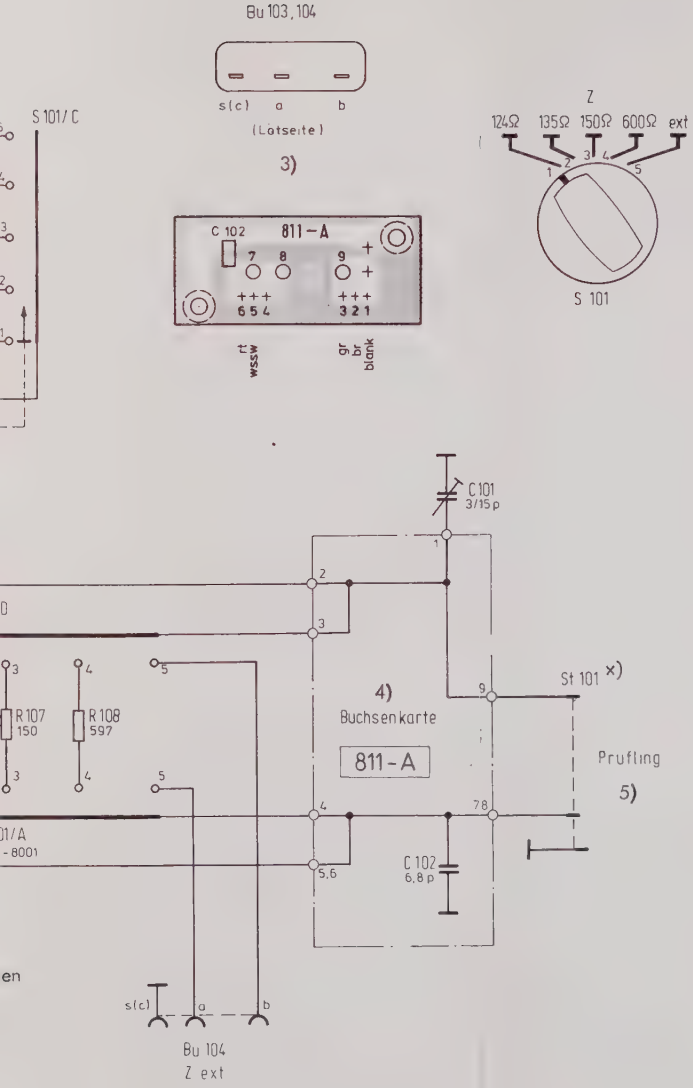
- Measuring configuration set up according to Fig. 2-8
- switch [2] of SDZ-12 in position RECEIVER
- connect external termination resistance to [3]
- connect external $Z/4$ resistance to Bu [5]
- switch [4] in position "ext."
- switch level meter input to high impedance
- adjust send level to $\leqq \pm 10$ dB
- read level indication at level meter and subtract from send level.



1) Generator
2) Receiver
3) Soldering side
4) Connector card
5) Test object

x) Stecker St 101 in verschiedenen Ausführun
lieferbar, siehe Technische Daten

Plug St 101 available in different versions
see technical specifications



Symmetriedämpfungs-
meßzusatz SDZ-12

Signal Balance Ratio
Measuring Attachment BN 811

SCHALTTEILLISTE / PART-LIST

SERIE: 0811-8401.001 SDZ-12 AUSF:

TEILE-NR PART NO	SACH-NR ITEM NO	BENENNUNG DESIGNATION	BEZEICHNUNG 1 MARKING 1	BEZEICHNUNG 2 MARKING 2	MG QU	WERKNORM REF.DESIG	BEMERKUNG NOTE	SLFIL VERSION	AF	C
1BU 1	0000-1681.004	HF-BUCHSE,N.ISOL.	UNI 9D 75 M A	LT FL 14,0	1	119/09/04				L
1BU 2	0000-1681.004	HF-BUCHSE,N.ISOL.	UNI 9D 75 M A	LT FL 14,0	1	119/09/04				L
1BU 3	0000-3713.006	TF-BUCHSE	2+E M EB LT 4	00-3713.006/4	1	119/01/05				L
1BU 4	0000-3713.006	TF-BUCHSE	2+E M EB LT 4	00-3713.006/4	1	119/01/05				L
1C 1	0001-0014.141	C-TRIM KER SCHEIBE	3P - 15P NP 0 0,5	BR 16S-TRIKO 21	1	STETTNER				L
1C 2	0001-0004.122	C-KERAMIK EDPT	6P8 DP25 63V	NP 0 1B 56	1	110/02/09				L
1R 1	0000-7644.058	R-METALL	147R 1% 0204	TK 50 56	1	018/04/01				L
1R 2	0001-0000.265	R-METALL	33R2 1% 0207	TK 50 56	1	DRALORIC				L
1R 3	0000-7643.635	R-METALL	30R1 1% 0204	TK 50 56	1	018/04/01				L
1R 4	0000-7585.421	R-METALL	26R7 1% 0204	TK 50 56	1	018/04/01				L
1R 5	0000-7533.282	R-METALL	124R 0%5 0207	TK 50 56	1	DRALORIC				L
1R 6	0000-7515.158	R-METALL	135R 0%5 0207	TK 50 56	1	DRALORIC				L
1R 7	0000-7533.295	R-METALL	150R 0%5 0207	TK 50 56	1	DRALORIC				L
1R 8	0000-7514.984	R-METALL	597R 0%5 0207	TK 50 56	1	DRALORIC				L
1S 1	0811-8001.003	S-DREH	5K AU 26RAST 41X54 6X10	BV 811-8001	1	013/03/04		--- U		L
1S 1	0811-8002.002	S-DREH	5K AU 26RAST 41X54 6X11	BV 811-8002	1	EHE		V---		L
1S 2	0001-0034.147	S-SCHIEBE	2 AU 2-POL 16X 7X11	KMF-2U AU DICHTFOLIE	1	013/04/02				L
1UE 1	0811-7701.003	UEBERTRAGER			1					A

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